

AVIATION WEEK

A McGRAW-HILL PUBLICATION

JAN. 29, 1951

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Any time may find the GRUMMAN ALBATROSS anywhere . . . over warm Pacific waters or at icy arctic altitudes. Designed for air rescue and other activities on the open sea, this big Air Force amphibian has earned a remarkable record for saving lives during its first year of operation.

GRUMMAN AIRCRAFT ENGINEERING CORPORATION, BETHPAGE, L.

Contractors to the Armed Forces



On every B-36



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CONSTANT FREQUENCY AC POWER PRACTICAL

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It took an extensive background of experience in hydraulic mechanisms plus applied research on control components, bearings, metallurgy and fluid dynamics to successfully design this transmission. This was coupled with precision tool engineering and aircraft production experience to meet the exacting requirements of the B-36 application. The same reliable research, design engineering and precise production techniques are available for the solution of your hydraulic transmission problems.



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B.F. Goodrich



Sealed lips hold the secret of faster maintenance

EVERY time an airplane's aileron or flap is removed for overhaul, the flap and -long strip of control fabric between aileron and wing, has to come off. By stretching the selvage on some of the bigger planes with a bandage, the rods, up to 60 feet long, were fastened by scores along their entire length. And removing these hundreds of tacks for every wing and aileron maintenance job set up a lot of extra time.

Engineering at Goodyear, who were working on an aileron test for the B-36, had an idea that B.F. Goodrich engineers might have developed a better way

of doing this kind of sealing job. They had. It was the Passare Sealing Zipper—a zipper made with molded rubber lips along its entire length.

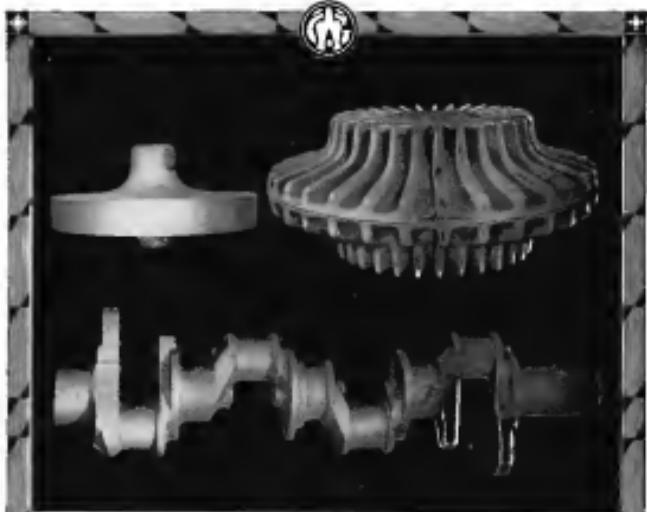
Put one service on B-36s that zipper

with rubber lips did the job. The new lippings lips provided a 100% effective seal against air pressure. And control rod reliability remained over 2000 hours after the zipper was applied.

Engineering at Goodyear, who were working on an aileron test for the B-36, had an idea that B.F. Goodrich engineers might have developed a better way

covering, can be used for light or heavy service. They are weight and space savers. They fit tightly around any shape, can be converted onto other fabric or metal. Typical applications include covering air tanks, fuel tanks, dry cell battery cases, larger tire covers. To get the help of B.F. Goodrich research and engineering with your problems, write The B.F. Goodrich Company, Aeronautical Division, Akron, Ohio.

B.F. Goodrich
FIRST IN RUBBER



Wyman-Gordon—specialists in the vital forgings of the internal combustion engine since its inception—is today the largest producer of crankshafts for the automotive industry and of all types of forgings for the aircraft industry.

Be it crankshafts and other vital forgings for the piston type engines or turbine wheels and impellers for turbo jets—there is no substitute for Wyman-Gordon experience.

Standard of the Industry for More Than Sixty Years

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Forgings of Aluminum, Magnesium, Steel

WORCESTER, MASSACHUSETTS, U. S. A.

HARVEY, ILLINOIS

DETROIT, MICHIGAN

NEWS DIGEST

DOMESTIC

Cost of living allowances totaling \$200,000 for the next three months are being added to the pay checks of 25,000 North American Aviation employees beginning Jan. 29, in line with the company's recently announced Bonus of Little Sharetors cost of living figure. The program was integrated in October.

Reports of personnel-attrition places under 5000 in company actions might be another indicator. December totals included 5121,860 compared with 52,000 at \$193,514 for previous month. Board was the top loser, taking 66 places.

Convair KB-5D made a nonstop nonstop flight of 51 hr 10 min, believed to be the longest distance flight by any B-52 type. Route and distance from base can't be disclosed.

Lt. Gen. Laurin Neutral arrived in Wiesbaden, Germany, to take over command of the USAF in Europe from Lt. Gen. John R. Coughlin, who is going to the Third Air Command at Langley Field, Va. Neutral has been Arthur Vice Chief of Staff, USAF and is noted as an astute strategic planner.

Boeing Stratofighter made the first nonstop C-95 flight between Hawaii

AFA, Hawaii, and Kelly AFB, covering the 3600-mile trip in 12 hr 16 min carrying 61 passengers from Hawaii at an average speed of 302.2 mph. The plane landed with a margin of 1771 gal. at the tanks.

Panhandle Engine division starts at Douglas with 1000 in fourth week, with no settlement in sight. Company's time loss would have placed four more C-119s in Korea.

Douglas DC-8B delivered to USAF and American start early next month. AA plans to have 14 in service by April. USAF expects eight planes this year and 12 next year.

Avon Jetline flew nonstop from Toronto to Jacksonville, Fla., apparently nearly 900 miles, in 2 hr 35 min. Plane was to continue to Miami for more weather tests before returning to Toronto.

Westinghouse 140-hp passed 140-hp qualification test making it eligible for production. Started for a series of new Navy planes designed to take advantage of its tremendous power (delivered well over 14,000 lb thrust with afterburner), the J-49 has automatic electronic control system and standard dual master control stick-overs.



Here is one of the most compact servo actuators ever made. It is fully adjustable for replacement on the E-54A, F-4D and F-4C. It is ideally suited for valve or damper operation. Components and light weight (idle more than one pound) make it an mandatory where space or balance is critical.

Limit switches are fixed, unique and adjustable for any value up to 30° travel. Motors feature fixed ratios or controlled by externally of passive positioner creating a constant or the load limit reaches.

Operating at 36 volt D.C., the ROTOrette is available in two models, one of which can incorporate either a gear-reducing gearbox or an integral motor. Both models are designed for connection to Specification AN-M-49 (Waves and Radio, including Pulse), USAF-1105 (Electrocontrol for complete assembly) and USAF-4123 (General Requirements—Medium Attitude Specification).

Price for Bulletin 718.





SIDELIGHTS

Mildmay

Navigators still serve the most critical aircrew shortages in USAF. Possible is that we'll return to F-4s, again as proposed in USAF & Navy, because of bad experience with the new aircraft. The USAF has been forced into Midwest, an unsuitable SAC mission will transfer to a Mach 2 McDonnell fighter. The Air Force has been forced to buy the F-4s they needed for patrol, engine fighters. In Korea only five bombers and intermediate maintenance are handled by ground crews. All major aircraft in class by rear maintenance are handled by ground crews. In F-4C in Korea had engine damage, stalled engines at densities, etc. when had few days pilot position which were stored flew into USAF fighters. The use of current aircraft is not possible. The F-4C is not up to 10,000 feet on last mission. The USAF would consider longrange heavy bombers groups in their field mission about deep penetration, but the aircraft is not up to the job. *Major of USAF, Gen. Carl*, a few hours ago proposed may use pilots for the big *Phantom* fighters.

References

Kaiser-Fraser a decision plan to apply for membership in the Central Intelligence Agency.

Tom Males Co., names Gould French director of its new defense organization office at 128 Constitution Ave., a Washington. A major policy plan mainly remained as it has crossed new action but new rate of production isn't outlined in revised, so it has had to taper off implementation because of slower schedules than it anticipated.

Government

NACA has virtually completed its drafting studies for transients. Recommended general procedures for lateral water landing of helicopter calls for coming down slowly as possible, consistent with good control, and then dropping, "falling" parallel to coast, to a point where a lateral downwind approach is safe. Wright Field's old search-and-rescue manual has mandatory authority to transients, a dependent on procedure requirements to get early approach. NPA has issued a circular. Capt. Alvert Mathewes filed a petition at claimed agency and Minnesota State Dept. for review, so will "do what he can," Capt. Davis, but it has shown no outcome.

(Annotative Callouts will be found on p. 84)

PICTURE CREDITS



HOAC'S FIRST COMET—First production DH Comet jet transport, G-ALYP, slated for delivery to HOAC in the coming month, looks on its wheels during first flight. Note how small large main landing gear. Interior has yet to be furnished. With 14 Comets on order, HOAC's future is, as you might add, to be assured, but not before the end of the year. Standard conditions will be issued to HOAC for route radio

Aviation News Picture Highlights



MARKING ON THE WAY—Marlin PSM 1 Marlin fishing boats for the Show will have these new features.



PACKET SOLVENTS—For child's off C-129 line seen during the attack 1000 L 150-400 ml.



REILING: THE CANTERBURY-BAGGAGE are Bell 47 400 (left) with something weight to move Niagara Falls over land.



MEGS IN GERMANY-Fast photo flashes of MiG-15 fighters on the ground at Grossenhain, near Dresden.

CECOSTAMP

Model "L"

The Hardest Hitting Cecostamp Ever Built



Wider Range of Work: The Model "L" Cecostamp can handle a wider range of work than previous models.

Easier Operation: Concentration of controls makes for ease of operation.

More Accurate Operation: Valve porting and valve tripping give smoother, accurate action.

Greater Safety: Operational hazards have been largely overcome. Controls are centralized for safety and ease of operation.

Lower Maintenance Costs: New shock absorbing features have been incorporated to cushion vital parts.

Write for a copy of Bulletin 30-C.

CHAMBERSBURG
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WHO'S WHERE

In the Front Office

Gen. Joseph L. Elyea, (Retd.), former commanding officer of the Army Field Forces, has joined Standard Oil Co. as technical assistant to the president. Gen. Elyea will be responsible for a company-sponsored program to separate the Army from the oil companies. He will study and, if he can, also interpret the military's problems to the Air and General Forces. He will maintain offices in Washington. Col. D. C. Davis has 40 yr of active service with the Army when he retired in 1949.

Robert MacMillan has been elected vice-president of Fassina Facchini Co., Mississauga, Ont., and has been with the firm for over 20 years, recently in sales representation work abroad.

William Van Doren, veteran aviation publicist, has joined Eastern Air Lines as a vice-president in charge of operations. He is the president and general manager, continuing EAL's public relations, news bureau and advertising. Past associated with Pan American Airways in 1938, he began and directed the carrier's public relations program. He has also been a member of the United Service Committee, continuing to conduct public relations until 1945. Mr. Van Doren established his own business as management consultant, managing last year with George E. Ladd. He is now on an indefinite leave of absence to handle his new post.

E. M. Kremser, aviation assistant to the president of Miles Aircraft Corp. of Kinston, N.C., has been appointed in charge of production of the T-1 USAF fighter/reconnaissance plane which MFC will make under license from Lear. He joined Miles Aircraft in 1946.

What They're Doing

James Collier, Northwest Airlines vice-president in charge of operations, is continuing at first head, personnel and finance trials and travel publications between the U.S. and the East. His itinerary includes Japan, Korea, China, France, Manila, Hong Kong and Spain.

Changes

Joseph A. Sestini has been promoted to director manager of Republic Aviation Corp.

Cpl. "Cook" Blatt, of Berlin Airforce base, has been appointed general production manager of Federal Avionics' Bell helicopter division, and Lt. Col. John C. Collier, former aircraft division manager, has been made assistant general manager of Republic Aviation division at Cleves.

Gen. J. MacNeasey has been named by 75th Aviation Troop Assault to improve operating and production methods in the first year of the program. Gen. MacNeasey has been made assistant general manager of Kaman Forces and will work on the C-110 project.

INDUSTRY OBSERVER

► Postage rates are up: reports of a map of U.S. North American P-51 fighters for British Electric Canberra jet light bombers are inaccurate. Lt. Gen. K. B. Wolfe, USAF Deputy Chief of Staff, Materiel, and G. C. Prentiss, president of Glenn L. Martin Co., have made a quick trip to England to review the Canberras for possible production at the Mid-Atlantic River, Md., Martin plant, now operating at its fullest capacity. It is reported that Martin will produce both its own aircraft and X-28-1 bombers, which has made high performance than the Canberras, and the British planes will still have the principal light bomber mission of supply to USAF. Prior to Martin production, USAF will probably procure a limited private test aircraft of Canberras from an British manufacturer.

► Elihausen flying post office designs such as have been developed by Convair for the XC-99 and Forland for the C-119, are not expected to go very far with Post Office officials. They are also interested in pack-type planes, which could load interchangeably, so that the post could be sorted in the ground before starting out and the whole air payload advantage could be utilized. Disadvantage of the "bring nothing until out" plan is said to be that the airplane fly so fast they reach destinations before the sorting clock has a chance to classify the mail.

► Consolidated Vultee has virtually completed arrangements for sale of two of its 246-A Convair Liners to Ambrite-American Oil Co., which already owns two of the earlier 246s.

► USAF is renegotiating a standard cargo packaging arrangement for arbitrary air cargo, to fit onto a C-47A (46-811), selected at the moment as the ideal size for loading into the various cargo planes now in use.

► Glaser Metres is expected to be the first British-built jet fighter to see service in Korea, winning the design of the Royal Australian Air Force. It is said the 36 of the Metres are on order.

► Rear L-17B (airplane version of Novair) with Ratio assist has been taking off at full gear in an average distance of 200 ft. to gain its maximum at Ft. Bragg, N. C. Approximately 40 ratios have been made in 29 test flights made, including ones down emergency-type runways, deep sand, and asphalt surfaces. Army Field Force requirements for fighter plane Ratio are not likely to be developed from these tests, which showed maximum performance from each model field.

► Watch for increased procurement of airborne equipment to earth Atlantic Fuel stations. With Finsudol C-119G claimed as the standard airborne flying car for Mutual Defense Assistance Program present status, it is expected that standard airborne equipment to fit this plane will be used. Assignment of Maj. Gen. Lyman Lasseter, former MDAF program director, to Commanding General of the 11th Airborne Division also may be related to a future program for MDAF country airborne troops and equipment.

► Problems of finding swept wings for Navy carrier planes has been dredging over new designs, some with double folds. The theories of the "softer plane" wings, as well as the unsophisticated, primitive static folding problems.

► Probably the first British tandem helicopter design, the Bristol 175, capable of carrying two passengers, is expected to fly next year, powered with two Alvis Leonides 750-hp engines. In general outline, it closely resembles the Puma and new Bell anti-submarine helicopter, except that the latter plane is mounted on a very big tail, and there seems to be no use of front and rear rotor discs.

► A new Saab/Saab engine development is involved with a thrust rating of 10,000 lb., one of the highest ratings yet claimed for any foreign engine (Aviation Week, Nov. 17, 1952, p. 17). The Saab engine may be the one of 14,000-lb thrust engine which Westinghouse, Pratt & Whitney, General Electric and Allison are developing.

Washington Roundup

New Harry Hopkins?

National Security Resources Board's chairman, W. Stuart Symington, may become President Truman's "Harry Hopkins." His Presidential adviser, by statute, right now NSRB is being stripped to skeleton status. Its personnel and functions are going over to Office of Defense Mobilization, under Director Charles E. Wilson.

See Charles Tolson, aiming to clarify the new defense alphabetized letters, quoted Wilson: "And what's Mr. Symington's place in the mobilization picture? You are in charge of it. What is his relationship to you?"

"Very firmly," Wilson stated.

Symington has made it clear he intends to stay on in Washington. He says he is "retired," he will not return to the Department of Defense in its Secretary's mounting report.

As NSRB chairman, independent of most administrative duties, Symington will be in the key spot to act as Presidential adviser. He sits on Cabinet meetings, is a member of Security Council, has policymaking body, and a member of the Defense Mobilization Board which advises Wilson.

\$87-Billion Defense Program

The services have now blueprinted an \$87-billion defense program for the period from Jan. 1 to June 30, 1952. This is the amount that will be appropriated and required.

The cost will be that of from \$200-to-\$300 billion will be for strength procurement.

Last of Second Supplemental funds, some \$1 billion, is now being considered. The Third Supplemental, which will go to Congress within a month, will add \$20 billion to this year's earlier. The 1952 fiscal year budget sets \$32.5 billion for defense, and there will be \$31.5 billion for European military aid.

Expenditures during the next one-half year period will be in the neighborhood of \$60 billion. This means the present military effort might not be matched until the end of 1952.

The program will reach \$90 billion—or over Defense Department's estimate, Assistant Secretary W. F. McNair, commented: "The \$82 billion for the 1952 fiscal year is a little on the low side. Don't hold us to that too specifically."

Diversity of Supply

Washington will bear down on manufacturers to have at least two sources of supply for all materials and parts. This should avert possible stoppage of one source if cut off through labor trouble, sabotage, bush attack.

Prime contractors will soon be asked to furnish period reports on subcontracting, to encourage buying out of work over the economy.

Navy's Strategic Role

Navy's bush-dark carrier, scheduled for completion in about a year and a half, points to an end of USAF's monopoly on strategic bombing. It will be a "necessary" role of the Navy, House Armed Services Committee's

challenger, Rep. Carl Vinson, commented on the proposal: "I don't think that any one branch of the armed services should have a monopoly of the use of any particular weapon." And, if the Army can develop long range strategic guided weapons, it too should participate in the strategic mission, he suggested.

This is but the new 37,000-ton carrier, to be called the James V. Forrestal, companion with the proposed 60,000-ton United States. The carrier will be ranked, and the 45,000-ton Midway-class carrier.

• **Dash Midway.** 993 ft. long and 153 ft. wide. James V. Forrestal, 1000 ft. long and 215 ft. wide.

• Minimum aircraft range for return mission Midway, 1000 miles. United States, 1700 miles. James V. Forrestal, plans in design day it will have a range "substantially exceeding" those contemplated for the United States.

Kaiser's Secrecy

The Senate Banking and Currency Subcommittee, headed by Sen. J. William Fulbright, hasn't lied the agency of Kaiser-Frazer Corp. negotiations with Reconstruction Finance Corp., and so it was last week.

The 144 officers here in the concern in 1949 had made "after prolonged secret negotiations" after it had been made to the public interest which it served was now open to government. It should have been helpful to the RFC decision if the signature pro and con had been at that dredged when the loan was under consideration . . .

Negotiations for the \$25 million additional loan last December "were also conducted in secret until the loan had been made in which public disclosure could add little value to the negotiations." This loan was extended through the RFC in the final days of negotiations with great caution and little objective argument. One of the principal arguments for the new \$75-million arrangement was the contention that it imposed the quid pro of the making available aircraft production. This is a jewels which the government independently.

Sen. Lester B. Saltonstall's Subcommittee is now looking into a move to give Kaiser-Frazer a USAF plane contract—especially to "improve the quality" of the \$25-million loan.

Fulbright is pushing legislation requiring a public docket of all RFC loan applications to take the secrecy out of negotiations.

Here and There

• **Research and Development Expenditure.** will be almost exclusively for the procurement of test items. This is in line with the policy of concentrating on projects which promise operational use at a short time.

• **Training planes.** Neither USAF nor Navy will procure any. "The last four to five years," Assistant Secretary of Defense W. F. McNair reported. One program can be purchased.

• **Bansin MiG-15 fighters.** It has shown superiority in Korea to the F-86s and F-84s that were in operation there, NSRB's Symington reported, but the F-86 and performs it. • **"Wing."** is a "sophomore" group in USAF's vocabulary. The difference the group includes operational and support aviation only, the wing includes the, plus medical units, motor pools, etc., to make it a complete abstraction.

AVIATION WEEK



AF Studies Douglas Design for B-36 Role

New interest shown in year-old proposal as USAF again seeks new big bomber.

A third, long-drawn-out proposal has been tendered for the forthcoming new USAF intercontinental bomber. It is a Douglas design, a follow-on the Boeing XB-52 and the new supersonic, higher flying, long-range bomber. Plans for all of the present B-36 programs because of the interceptor threat is already scheduled by Air Force planners.

For the next 100 days, it is reported, **Ponca** Committee, Presiding, general manager of test, jet and nuclear weapons enterprises has dictated a need for a new supersonic, higher flying, long-range bomber. Plans for all of the present B-36 programs because of the interceptor threat is already scheduled by Air Force planners.

Plans for the B-36, scheduled by Jan. 1953, will find an operational total of more than 250 of the giant bombers with the Air Force. The big bombers, backbone of the nation's long range defense, were designed to provide the U.S. with an air arm capable of striking a target anywhere in the world from bases within the Zone of the Interior.

• **Other Considerations.** Already under consideration by the Senior Officers Board are:

- **B-52.** In appearance, the Boeing had the long range heavy bomber contract greatly resembled configuration of the in progress B-36 now as produced at Boeing's Wichita plant.

Through somewhat smaller than the present transoceanic Convair B-36, the XB-52 is designed to meet the same strategic bomber requirement capability of carrying 10,000 lb. of bombs 10,000 miles. Powerplants for the XB-52 are eight jet engines, along is pairs, two in a pod, under each wing. Wings and tail are swept back at a 7-degree angle.

Convair's top priority proposal is for its turboprop version, but rididuous sources believe that a supersonic turbo prop proposal will first to give the company maximum performance data for the planned turboprop version. This will, the supersonic engine and propeller companies additional time to

complete its reported to be one, including refit new proposed for long range mission. This plane was ordered by USAF for 1952 delivery, but schedules have been stopped up and experts are that the turboprop version will be no flight test late in 1954.

Convair's supersonic B-36, Convair's Viking, is viewed USAF proposals for two modifications, both of which feature existing design of the present B-36 to meet new Air Force strategic bomber requirements. One proposal is a turboprop, the other a jet.

Final configuration of the can not production B-36 would change greatly in both.

Convair's configuration would satisfy the same, but wings will be much more rounded.

The plane's tail configuration is much and gives a low angle of attack. Convair's plan is to have a high angle of attack.

Designs of both Convair proposals are shown as profiles below the wing. Turboprop configuration includes provisions for my engine, along as single pods, three under each wing. Turboprop powerplants will provide 12,000 miles, shared in a pod three pods under each wing.

Convair's top priority proposal is for its turboprop version, but rididuous sources believe that a supersonic turbo prop proposal will first to give the company maximum performance data for the planned turboprop version. This will, the supersonic engine and propeller companies additional time to

were not the present design difficulties. Design proposals issued by the Convair group—McDonnell, Vought, and for a heavier version of existing 10,600 lb. of launch 42,000 lb. at 530 mph, at an altitude of 55,000 ft. Convair's proposal remains the same, 11, plus a four-man crew.

► Strategic Bomber Requirements—Long-term goal of the USAF for its long-range bomber has been the development of an aircraft fully capable of intercontinental strategic bombing. The plane must provide a weapons payload that can deliver a combat load into any chosen target within reasonable flying time at any point on the globe and return to the U.S. without refueling.

The strategic bomber must meet three primary tactical requirements:

► Combat radius. An aircraft heavy strategic bomber requirements call for an aircraft with a range sufficient to permit operation to defend energy targets from outside U.S. bases. Studies have indicated that a heavy bomber possessing a combat radius of 5000 nautical miles will be required to be able to strike all the landmarks of a potential aggressor and return to the U.S. without refueling.

► Combat altitude. USAF studies have indicated that heavy bombers capable of operating at altitudes above 50,000 ft will have a reasonable margin of safety from enemy fighter plane interceptors. This margin is shown to be sufficient to maintain suitable low attack rates.

Low-level landing of heavy bombers makes it difficult to maintain a steady pace to outdistance enemy fighters while maintaining an armament altitude. Flight-air margin between top speed and landing speed drops rapidly at altitudes above 40,000 ft.

► Combat speed. Top speed of the current heavy bombers, the B-52D (405 mph), is already sufficient to force enemy interceptors to supersonic speeds if they are to pursue them in time for war.

The present efforts of Staff detailed to hold to the B-52 as "top dog" of U.S. strategic strike until 1955. Studies conducted by the Joint Warfighting Systems Evaluation Board for JCS have shown the inability of current jet fighters to make a significant percentage of successful attacks against the B-52 at combat altitudes (Aviation Week Nov. 28, 1958).

► Douglas Model 1211—The design of the Douglas Model 1211 has been presented with three actual requirements:

Wings and tail surfaces are required to be of the same weight as the present wings and tail surfaces of the B-52. Gross weight does not include approximately 2000 lb. of unique droppable fuel-cell gear.

Normal fuel load of the 1211 is 170,000 lb.

of fuel is carried in droppable wingbaskets.

The Douglas design proposal calls for a bomber with a normal combat range of 11,000 nautical mi. and a maximum combat radius of 4340 nautical mi. Basic design of the bomber includes provision that, with a normal increase in combat distance, and a reduction in combat ceiling, the combat radius can be increased to 5000 nautical mi.

Douglas' proposal designed for a wing as aspect ratio 12 in combination with a target weighing of 30 lb./sq. ft. and a maximum combat radius of 11,000 nautical mi. requires a combat distance of more than 35,000 ft. at a rate of climb of 50 ft./sec. with present turbofan engine capabilities, and a combat altitude of more than 50,000 ft. with fighter engine ratings. Absolute ratings of the plane are not yet known, but higher.

► Picking the Interceptor—Design study shows that interdictability requirements for 1000 hours of flight without altitude loss at combat altitude are not yet known. However, it is possible to provide a reasonable margin to combat and immediately planned interceptors, both from the climb and maneuver standpoint.

Study of the Douglas 1211-3 is expected to yield 500 knots at 50,000 ft. with generally planned warhead impact. Considerably higher combat speeds are expected with future engine ratings. Studies have indicated that it is not generally feasible to design a heavy bomber with the combat radius of the 1211 which would have been combat effective.

Design of the 1211-3 was suggested to provide a speed high enough to force interception to supersonic speeds for maximum survivability.

crew complement of the Model 1211 is nine, including refuel flight crew for long-range mission. The plane is equipped with complete electronic gear for landing ground target and for range and detection of enemy interceptors. The aircraft is to be used for primary intercept and ground attack, and for forward as the fighter in a penetration role. Bomberhounds and radio engineer is a programmed main complement.

Escape hatch for the crew is located on the underside of the fuselage between the nosewheel gear doors and the forward bomb bay. Present aircraft cannot provide the conventional 7000 ft. ejection plus provision for flight as well as rocket boosters.

Wings and tail surfaces are required to be of the same weight as the present wings and tail surfaces of the B-52. Gross weight does not include approximately 2000 lb. of unique droppable fuel-cell gear.

NACA Says

Transonic problems need quick solutions for us to stay ahead in air.

Ability of U.S. aeronautical research to come up quickly with the right answers about transonic flow in the difficult supersonic transition region of flight speeds holds the key to a certain question: Will the U.S. maintain the leadership in aircraft design and power?

Dr. James Clark Huynh, National Aerospace Committee for Aerospace Education, last week reported to Congress: "Critical problems (in transonic research) require solution before we can exploit the military advantages of supersonic speed."

► Rich Field—The NACA chairman reported that the development tasks composed of the military services, the research academy and NACA are making substantial progress, but that further leadership is needed to overcome some of the basic problems soon and risk inherent in developing flight characteristics of both aircraft and missiles is all good reason.

Future war information is needed in the field of stability and control involving the dynamics of second and third order in the capacities of human pilots, autopilots and guidance systems. In spite of jet propulsion advances made thus far, great further improvements in power are needed to reduce aircraft performance from transonic to supersonic.

Strength and operational problems also show up as major factors for research future records, he pointed out.

The Hawaiian letter to Congress passed NACA's 364 aircraft report, which cited progress made in basic research in the committee's biannual meeting during fiscal year 1958.

► Aerodynamics—Program experimental flights with partial aircraft as testbeds and separate wind tunnel studies are now being conducted that large and small aircraft research operations will be conducted throughout the transonic range with lower operational test altitudes than anticipated when detailed problems are solved in continued research.

► High-Lift Devices—Program of high-lift devices such as leading edge extensions, flap and trailing edge flaps, etc. study that using the two together offers the best combination for additional lift needed to improve the low speed performance of the aircraft required for transonic flight. This analysis required for the aircraft to be used as a fighter and as the long-range strategic bombardment aircraft.

► Boundary Layer—Study of boundary layer control of airflow by suction through leading edge slots on a 47° degree迎角 wing shows the need for longitudinal air intakes found in the rear wing in the

high-lift range, without the slots. As much as 10% leading characteristics of a transonic type plane, showed that boundary layer air that would reduce the total leading distance was 33 ft. shorter, by from 35 to 45 percent.

► Hypersonic Facility—A new hypersonic facility at Langley Laboratory is planned to open up to Mach 6 by four previously built hypersonic research planes (Edgar, AF-2, AF-3 and AF-4) and two new ones (Bell X-1 and Douglas D-558-1), the high altitude Douglas D-558-1, and the transonic Northrop X-4 and a North American F-86.

► Air Inlets—A new type of submerged air inlet, designed to reduce the drag pressure in the leading surface, allows greater speeds of supersonic flow at inlet peak levels for jet aircraft.

► Maneuverability—The new supersonic aircraft should be able to maneuver at supersonic speeds.

► Speed—A new research test at Langley with models of 11 specific planes had a speed reduction on high-speed propeller aircraft of external fuel tanks on supersonic characteristics. Tests showed that when a transonic test up to Mach 1.2 speeds

was necessary to jettison the tanks to roll in open recovery, the rolls could roll all parts of the aircraft.

► Flight Control—Flight characteristics of a transonic aircraft at high altitude and transonic speeds were subject of a series of flight research tests with the NACA's stable of high speed research planes (Edgar, AF-2, AF-3 and AF-4) and two new ones (Bell X-1 and Douglas D-558-1), the high altitude Douglas D-558-1, and the transonic Northrop X-4 and a North American F-86.

► Air Inlets—A new type of submerged air inlet, designed to reduce the drag pressure in the leading surface, allows greater speeds of supersonic flow at inlet peak levels for jet aircraft.

► Maneuverability—The new supersonic aircraft should be able to maneuver at supersonic speeds.

► Speed—A new research test at Langley with models of 11 specific planes had a speed reduction on high-speed propeller aircraft of external fuel tanks on supersonic characteristics. Tests showed that when a transonic test up to Mach 1.2 speeds



NEW BONANZA carries Beech's hopes that executive planes will continue to be military as modernization of its way.

Beech Puts C35 Bonanza Into Production

Production at \$12,900, Beech Aircraft fabricators program in Wichita, Kansas, last year's volume was \$1,705, but the company is looking to the future for a large increase in the company's sales campaign. The campaign is going strong in the fact that the need for business aircraft is greater today than ever and they would be a great addition to any market. The firm is optimistic about the future, but it is not known how the firm's position in the "old" is fluctuating.

On January the third day morning, the firm took with them some of the new Beechcraft demonstrators along with the flying crew, the knowledge that current production schedules will soon be cut to 10 by the end of the year.

The company is prepared for the fact that it had orders with firm deposits for about 180 C35s for early spring delivery, even before its distribution or their customers had seen the plane.

Production at \$12,900 goes to 205 at 2000 gross weight (3000 pounds) and take-off weight of 1600 lb. at 10,000 ft. and 155 at 2500. The engine is a Cirrus radial E-155-11. The 15-in. Beech, electrically controlled, variable pitch prop has aluminum alloy blades.

Engines and prop improvements will have increased rate of climb to 1000 ft./min. at gross weight (3000 pounds) and take-off weight of 1600 lb. at 10,000 ft. and 155 at 2500. The engine is a Cirrus radial E-155-11. The 15-in. Beech, electrically controlled, variable pitch prop has aluminum alloy blades.

Transonic flight has been boosted from

the C-135 can range 862 mi fully loaded without extra fuel. Service ceiling is now at 43,000 ft and absolute at 49,000.

Cessna empty weights have both gone up; they are now 1,700 and 1,625 lb, respectively (the B-15 was 25,500 gross and 1,975 lb empty). ▀

New Design. **Patentos**—A wingspot like at the leading edge has improved stall characteristics and decreased need for the former stall strips. Also, vacuating the fuel-tell indicator's closed sheet 20 percent gives better directional stability, while a change in position does not affect the indicator's reliability. A Salt Flight stability-measuring device has been modified. To prevent inadvertent landing gear retraction, a warning horn sounds if the switch is moved to "up" position while these are weight on the wheels.

The Lear L7R-5 with VHF transmission on six channels, VHF reception on the controllable receiver, smaller horn antennas, and range and broadcast band reception has been added to the standard equipment list. The speaker system has been improved and increased with the other changes, and for better safety and acceptance. The C-15 also features a new front passenger reclining rear seat and which now has a full weight load test. Cabin air circulation has been improved by putting in an extra fresh air venturi as well as another one.

Principals of the Cessna are offered with a complete aircraft exterior paint scheme included in the standard price. Should a customer keep coming through, it looks like a good personal-service plan, you should do the best—especially with the newest competition, Ryan, but remember, competition is present at certain Nacon airports.

IAS Honors Night Awards Go to Five

Five important aviation awards are being presented at this year's Boston Night dinner of the Institute of the Aerospace Sciences, tonight at New York's Hotel New Yorker. The awards are:

• **Dr. Hugh L. Dryden**, director of the National Advisory Committee for Aeronautics. The 1950 Guggenheim Award, for his "outstanding leadership in aeronautical research and fundamental contributions to aeronautical science."

• **Robert B. Gilman** of NACA's Pilotless Aircraft Research division at Langley Aeronautical Laboratory, the Sylvanus Albert René Award for the "conception and development of new instruments for observing transonic and supersonic flow using freely flying models."

• **Frederick N. Pfeiffer**, 35-year chairman of the board of Paratex Industries Corp., the Lowrance Sperry Award, for

Name J. P. Adams

President Transocean last week sent to the Senate for confirmation a nomination of Joseph P. Adams, former Washington State insurance director, to become a member of the Civil Aeronautics Board for a term ending Dec. 31, 1956. Adams' selection for the Board would control by the transfer of his predecessor Russell B. Adams (as selected to the post of Ambassador to the Secretary of State for Aviation), was exclusively forecast in *AVIATION WEEK*'s Washington Roundup Dec. 25.

a notable contribution made by a young man to the advancement of science."

• **Ronald R. Bushnell**, Jr., a research scientist at New Mexico School of Mines, on leave from the U. S. Weather Bureau, the Robert M. St. Loyer Award, "in recognition of outstanding contributions to the science of meteorology as evidenced by his research."

• **Major Gen. Otto B. Bousman**, USAF (MC), the John J. Higgins Award, "for outstanding contributions to the advancement of aeronautics through research."

Principals speaking at the dinner tonight, being held at Hotel Astor in the Empire Underwriting at State James W. Webb. The dinner is a feature of IAS' 19th annual meeting, which starts today and continues through Feb. 1. Newly elected *Aviation Week* President, American and Mexican, is the chairman. Fellow of IAS also serving on the program's dinner. In the first group are Melvin S. Aiken, Jr., NACA; Gen. Adm. Curtis M. LeMay, USAF; Edward F. Botton, Douglas Aircraft; Lt. Gen. Benjamin W. Chidlow, USAF; Sherman Fairchild, Sherman Fairchild Associates; Robert L. Hall, Columbus; and George S. Schreier, Boeing.

At present, American Fellowship is the only one of the CAA's 12 sections that has not been assigned to a CAA committee. The CAA's 12 sections are:

Air Force and the Birmingham plant will be negotiating with Birmingham, Ala., city officials to restructure the former Federal-McCormick plant used during World War II to modify B-17 bombers.

Air Force said that the Birmingham plant will "serve more as a maintenance center for USAF aircraft." Specific aircraft to be modified have not yet been determined, nor has the contract been let.

Five boys of the big facility are now under lease to Chase Aircraft Co., Trenton, N. J. As winner of the recently conducted assault aircraft competition, the company is planning major production of XC-131 assault transports at the Birmingham facility.

Three contractors will have an experimental aircraft, Philip B. Taylor, Rep. of the Contract Development Board, Mr. Gen. V. E. Belmont, Director of USAF Safety and CAB Chairman Delos W. Russell.

Production, Priority Agencies Set Up

These new agencies that will handle production and priorities assignments of military and civil aircraft were announced last week, confirming the priorities and production program outlined in *AVIATION WEEK* Jan. 15.

• **Aircraft Production Resources Agency** is an outgrowth of the recently reorganized AF Wright-Patterson AFB. It will inherit responsibility for the production of military and commercial aircraft. APRA needs additional authority to schedule production and should get it from Defense Production Authority soon. APRA's full-time director will be selected annually by Air Force, Navy and Army.

• **Office of Aviation Defense Requirements** at CAA, will handle collection of aircraft applications for and final use of defense and allied funds for essential civil aircraft, and other aircraft required for national defense.

The office is headed by Lt. Col. G. R. Glazier, who has been CAA's standardization coordinator since World War II, when he worked closely with WPAF.

• **Controlled Materials Planning** division of DPA is not operating yet, but by July 1 is expected to start allocating war materials.

It already has an nucleus in a growing staff of former WPAF men and industry representatives. This group is headed by Walter G. Stoltz, who directed CMAP under the WPAF

and who probably do the same under DPA. It is setting up CMAP using basic concepts of the CMAP of the last war.

AF Tells Plans for Birmingham Plant

Air Force officials announced last week they are negotiating with Birmingham, Ala., city officials to restructure the former Federal-McCormick plant used during World War II to modify B-17 bombers.

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NUCLEAR BARREL. North American Aviation's Air Force Interceptor, will serve as model for Navy fighter wing version designated FJ-1.

Navy Orders New Jet Fighter from NAA

FJ-1, patterned after Air Force's F-86D all-weather plane, will be produced at Columbus, O., plant.

North American Aviation's new Navy FJ-1, carrier fighter version of the cost-cut power-sweeping F-86 Sabre, is due to be produced at the Columbus, O., plant formerly operated by Curtiss-Wright Corp.

It is understood that the FJ-1 version to be marketed for Navy carrier use in the FJ-1 will be the F-86D after some modification, which has a pointed nose containing an intercept radar. Major modifications to the F-86D design will be adapting the nose wings for folding, and fitting up the fuselage for carrier landing and arrested landing.

It is expected that North American will start its peacetime production lines for the F-86 and FJ-1 planes for Air Force and Navy at the Columbus plant which will begin to operate a few months ago. An order to Columbus construction of the Navy plant will be given as soon as possible to a selected prime contractor to produce it under license at another plant. It is possible that the assignment will be forthcoming as soon as the Columbus production of additional quantities are started. But main North American production of the plane will be at Columbus.

The new intercepting FJ-1 plane, manufactured by North American of Columbus, will have a maximum speed of 670-680 mph, set Sept. 15, 1948, considerably faster than any operational carrier plane the Navy now has. Range capability of the F-86 and FJ-1 fighters will make it relatively easy to stage the Air Force fighters for carrier duty. Each already has with the intercepting plane an extended carrier approach and landing, whereas it will have no severe maneuvering problems in shipboard operations.

Official announcement from North American says that the airplane to be produced at Columbus will be an advanced model of the F-86. North American completed its initial contract for F-86A Sabre line in 1950 and is now producing two later versions of F-86B and F-86C. ▀

The fighter at Los Angeles—the F-100A will be a jet interceptor with radar nose installation, and the F-100B with a nose refueling probe for greater range availability. The Columbus plant built for the Air Force will be one of these models or perhaps a still later development not yet disclosed.

Flying at a design gross weight of 17,715 lb, the Sabre has a turned radius of over 800 miles, which can be extended by use of external drop tanks.

United to Order New Convair-Liner

United Air Lines has given Consolidated Vultee Aircraft Corp. a letter of intent for 30 improved Convair 440s based on the recently announced Model 240. A formal contract, it is understood, is planned for winter of 1953.

Convair is expected to begin deliveries on the new aircraft in 1955 and finish up in 1959. Applications will already be in hand for options on more than 100 planes.

The United order, as particular, is regarded as a big feather in Convair's cap, as transonic aerodynamics have left that which used to be the world's record.

• **Largest Interceptor**—The F-100 is the largest fighter-interceptor plane ever built. It has a wingspan of 46 ft, a length of 46 ft, a height of 14 ft, and a maximum speed of 670 mph. ▀

• **Engines**—The F-100 is powered by Pratt & Whitney CF-8A, rated at 2400 hp, or the R-3350-CA-46B, with twice power at higher altitudes, also for climb and weight characteristics.

- **275-gal. fuel tanks** will be added to outer panels to up capacity to 1750 gal.
- **Gross weight** will be near 45,000 lb.

Debate: Prop vs. Jet for Troop Support

In the course of his coverage of the Korean action for AVIATION WEEK, Alfred W. Jones, McGraw-Hill World News correspondent, analyzed the questions in tactical air support as seen by both Air Force and Army and Navy offices. These reports appeared in the Oct. 2 and 9, 1958 issues. Reader reaction to these stories included a letter from a Navy commander about the aircraft ratios in the Korean War. Both this letter and Mr. Jones' reply covered such fundamental areas that they are of special interest at this time.

The Commander Argues . . .

I have read with interest your articles in AVIATION WEEK (on the support rendered our troops in Korea by jet fighters). I would like, if I can, and am allowed, to make a point that may be of interest to you. It is in connection with the requirements for close-support aircraft and the belief, apparently held by some, that tank assault must be jet powered. The airplane must, it would seem, be able to "live" in the air against enemy jet aircraft and "have a fair chance to fight off or run from the best the enemy has." The logic of this logic is me.

These points, with which I cannot agree, apparently stem from an inability or an unwillingness to differentiate the close-support problem from the air superiority problem. The requirement for a jet fighter-bomber is the opposite result.

Such a requirement will, I believe, result in a product that is a hybrid, neither the best fighter nor the best close-support aircraft. As a fighter, like the "long range escort fighters," it will not have the performance really to stand up against a pure fighter, or vice versa. As a close-support vehicle it will not operate as effectively nor as efficiently as will an aircraft tailored specifically to the close-support mission. However, the jet fighter-bomber must operate at a considerably higher cost in consideration not only of its fuel requirements but also of the complexity of appropriate armaments. As you have noted, these problems become increasingly important in the forward areas.

Local air superiority, although though not necessarily complete superiority, must normally be attained prior to troops being put ashore as in the field. This should be achieved by the use of the aircraft best suited for the purpose—the pure fighters. The strategic bombers and the interdiction fighters may of course contribute effectively to the results of combat in an armament. Conversely, we must at times face the necessity of operating in areas where we do not have an superiority. Command, that is to say, we will not be in a position to employ interdiction fighters, fighter-bombers, but doing first things first, must get an entry in the field designed to do the job properly and capable of winning control of the air. What is required is that the infantry should be given the best possible close support consistent with the importance of reasonable logistic demands upon the other services. The jet fighter-bomber does not, as my view, fit any place in this picture. I believe an example of the type of Douglas AD does eminently fulfill the close-support requirement. Any allegation that we cannot afford both types of fighter and the close-support aircraft, does not, I believe, stand up under logical analysis.

As you see, never, the Navy has in the past been the Comptroller for aircraft as a fighter-bomber (though I am positive that in strategic terms it is not accurate to describe it in the AD). That was possible. I believe, not only because of the abilities of the operators but also because of a fortuitous circumstance in the evolution of the fighter—something that is not likely to occur again soon.

In passing, do you know if any Air Force officers have

Mr. Jeasup Replies . . .

Your letter highlights what I consider one of America's greatest needs—an immediate thorough reevaluation by our best aeronautical experts of the necessary development in American aircraft in the light of the lessons and experiences of the Korean war. There are already indications that congressional men have considered analysis of an support role lead to some difficulties. Unless we carefully consider what we are going, I believe it is possible that America's military power may be seriously crippled by a waste of our resources in the construction of too few of too many types of combat aircraft.

Before I can fully answer that the one that does or does not fit into our military aircraft pattern, I recommend that he consider these points:

(1) Jet aircraft can provide close air support for infantry. The F-100 performance in Korea has been good proof of that.

(2) According to the analysis and research here it is unlikely that we will ever have anything approaching complete air superiority in the RIC as it exists. Korea notwithstanding (we owned the air), any assumption that we would have such superiority would be foolhardy.

(3) In the RIC we, close support aircraft probably will be under heavy antiaircraft attack and assault by enemy jet fighters would. It would be unlikely that we would long survive such an assault. The only way to survive such an assault over the little time existing is to be called in by the ground controllers. It would be a foolhardy adventure, and I believe we can safely call it a counterproductive risk.

(4) Jet aircraft offer possibilities for executing these difficulties. Jets in ground attack at airfields 100 miles behind the front line could attack enemy positions within 15 minutes of being called up by the forward tactical control centers. They could strike at high speed, repeatedly with only a small risk from anti-aircraft fire or an attack. Enemy ground interrogations indicate that F-100s and F-105s in Korea have been able to land in the airfield and start new patrols without any apparent concern fire could be expected. Aircraft on ground alert could be quickly armed for targets assigned. "Screaming" aircraft have to see what they have

(5) Korea has revealed an appalling shortcoming of the Army in maintaining the logistic services needed for operating close-support aircraft. In World War II, our engineers built 3000 B-17s in less than two months. In World War II, fuel pipe lines practically walked from the theater's fields. Not one fuel crop in yet in Korea. Communications have been at least as poor.

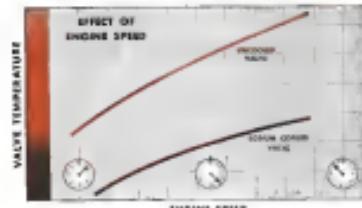
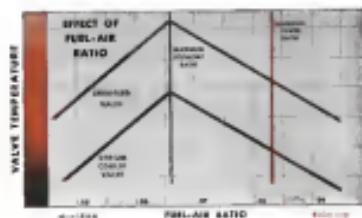
(6) Developing aircraft to compete with our potential enemy requires much development of bomb sights and control devices. That's a point on having late Twentieth-Century planes, if we are going to show them down to World War II speed and efficiency with only Twentieth-Century bomb sights, etc. I believe it would be playing fast and loose with our resources to continue building yet today's planes as an alternative.

Why Sodium Cooled Valves?

The trend of modern engines is to operate at higher speed and more economical fuel-air ratio. In considering factors which influence exhaust valve life, temperature is the dominant one. High temperatures sharply reduce the resistance to corrosion, distortion, and fatigue life of the valve alloy used. The effectiveness of sodium cooling in reducing valve

temperatures is shown by the curves below, which are typical of recorded test data.

The curve "Effect of Fuel-Air Ratio" shows that as the mixture is leaned out to obtain maximum economy, valve temperatures rise. The curve showing "Effect of Engine Speed" indicates that temperature rises quite rapidly as speed increases.



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Eaton engineers will welcome an opportunity to discuss the application of Eaton sodium cooled valves to engines proposed or new in design.

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contributions to trucking in Chevrolet's Dead-Spot parking brake, the new Ventiplane, and Chevrolet's new cab men . . . the very tops for riding comfort! See your Chevrolet dealer and take a good look at these 1951 Chevrolet trucks for your first opportunity. The "best in the business" are better than ever! today! Chevrolet Motor Division, General Motors Corp., Detroit 2, Mich.

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TWO GREAT VAUMLINE DIESEL TRUCKS—the 100-hp. Diesel in the 1/2-ton, 3/4-ton and 1-ton models give you greater power per gallon, lower cost per load. • **POWERFUL CABIN**—for smooth, quiet acceleration response • **SHARPER SPRING CATCH**—for responsive, responsive • **STURDIER**—more transversely—the front, smooth

driveline • **HYDRO BRAKE**—the smooth, positive action of the new hydro-pneumatic system • **NEW VENTIPLANE**—the improved cab ventilation • **NEW 5-1/2" WHEELS**—for increased tire mileage • **STANDARD DESIGN DOORS**—for easier loading and unloading • **NEW TWIN ACTION BRAKE**—keeps the heavy-duty model • **NEW DUAL UNDER-FRONT BRAKE**—for greater braking ability on heavy-duty roads • **NEW CAB MEN**—the increased comfort and modern appearance.

DRIVERS • NEW CAR SEATS—the comfortable, well-padded seats • **NEW OVERHEAD**—the improved cab ventilation • **NEW 5-1/2" WHEELS**—for increased tire mileage • **STANDARD DESIGN DOORS**—for easier loading and unloading • **NEW TWIN ACTION BRAKE**—keeps the heavy-duty model • **NEW DUAL UNDER-FRONT BRAKE**—for greater braking ability on heavy-duty roads • **NEW CAB MEN**—the increased comfort and modern appearance.



PROF. vs. JET: Douglas AD (top left), German F1F (top right),

The Cmdr. Argues . . .

been able to convince the infantry that the latter is becoming useful because no such close support has been flown? Any such suggestion is, I think, fairly groundless.

Without wishing to be contentious, but I realize that your reports were not intended editorially, I hope that I have made a valid point and have not unduly ignored the obvious.

None withheld on request

Mr. Jessup Replies . . .

[7] I wonder whether the logistic expense of jets is at high risk for some time. Let's consider Navy and Air Force strikes against the Yalu River bridge at Sinanju. The Navy and I both use F-86s for every type of AD. As you note, F-86s can carry up to 1000 pounds of bombs. At the bridges in flights of four or five, the ones with not covering aircraft. They were able to take one of these losses.

[8] Perhaps the F-86 would be a good pattern to follow

in future development of air-to-ground support.

It was developed in the Air Force's first jet. It was then

made into a good interceptor. Under war conditions, it

was refined by external fuel loading, making it a better interceptor. Further, it has in its load, landing

gear, bombs (up to 1000 pounds) and napalm tanks,

transforming it into a good ground supporter. Should we not consider the possibility of enlarging the very best jet fighters to conform to the requirements of the mission? The B-52 will be able to fly far enough for our

own use. The load required for both will be fuel and air

to-air weapons, probably rockets. Next will come ground

support missions. Here we change the load. Part of the fuel load could be replaced by bombs, napalm tanks, air-to-ground rockets or whatever other ordinance is required. I believe we might find ourselves with a better balanced, more mobile combat force, equipped with far more assets than we developed in the poorly specified original program.

[9] Given the above, I have suggested a long duration, requiring the extensive dependence upon air power in close support. They are convinced that ground bombardments are losing some of their aggressiveness and some of their effectiveness ground support weapons including field artillery. One recent attack in Korea can be analyzed in part in these sessions. Air support, however, is limited by weather conditions. Had the North Korean attack during spells of bad weather when we were holding the Naktong line as the south, division bombardments were certain we wouldn't have suffered the loss. Ground support weapons, including urban weapons, will be the volume needed to support the mads. Fortunately, the Korean terrain doesn't allow us to use such weapons. Otherwise, we would have had the grim business situation of having hundreds of aircraft flying helplessly a few hundred feet over a hilly landscape on which our soldiers were being driven into boxes.

There are some of the things which I think must be carefully examined if we are to avoid searching for an especially bad alibi. I hope these points may lead to effective further arguments by you and all our crews.

Best, I am continually assailed by the sheared propaganda struggle between the services, each privately trying to get more money to spend than the other. I suppose the Air Force's W. J. Jones, Chief Token Bureau, McClellan Hill World News c/o P.D., GPO, FEG APO 994, c/o Postmaster, San Francisco, Calif.

USAF Awards

As Material Control Personnel to
various makes available to Aviation Were
second bid awards, those on the page. Re-
quests for further information should be
addressed to Contracting Officer, AMC,
Wright-Patterson AFB, Dayton, Ohio, or
attention MCPCRSO.

3200-3201

how to "baby" a mammoth



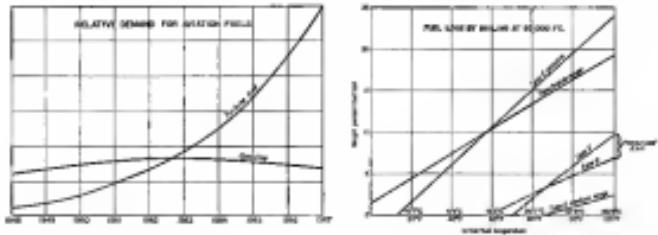
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What Properties Should Jet Fuel Have?

Availability of wide range fuel not sole controlling factor. Boil-off at altitude considered serious.

The jet fuel picture has not yet stabilized. The situation largely reduces itself to a matter of choice between fuel availability versus stability.

The problem is emphasised by the fact that by 1997, jet fuel requirements may be twice to five times what they now are.

The military, practically the sole user of jet fuel in that country, prefers a wide-range fuel, the JP-3 type, because

It represents greatest availability—about 50 percent of a barrel of crude can be turned into #15-5. Also, this fuel has a low freezing point, about -76 F.

The synthesis probably lies in a large seat belt approaching the #15-1 type, particularly for commercial use, because it is safer and does not heat away at altitude. Availability of this fuel is a factor, however, since the yield is somewhat less than 10 percent of a barrel of crude. This fuel is already selected world-wide.

At a recent *metropolis* series meeting of the Society of Automotive Engineers in New York City, Kenneth C. Fleet, technical manager of the Anglo-American Oil Co. gave an overall picture of the fuel problem in a paper "British Jet Aircraft Developments and Their Fuel and Lubricating Requirements." While this discussion was from a British point of view, it generally fits the situation in the U.S.

Panel discussion at the meeting included Hugh Hervey, Shell Oil Co.'s New York station representative, and E. A. Dregefelder, member of Frost & Whitney Aircraft's consulting engineering group.

Physical Characteristics of Typical British Jet Fuels

Type	1 G, 60/30	Flash Point	Freeze Point	End Point	End Vapor Pressure
A. Gasoline	405	40 ($^{\circ}$ C/100F)	-48C (-40F)	390C (734F)	Negligible
B. Wide-Range	77	-76.4C (-105F)	-55C (-67F)	1150C (2102F)	2-7 ts
C. Medium-Range	78	-113C (191F)	-56C (-67F)	1150C (2102F)	3-5 B
D. High-Flash Kerosene	309	68C (152F)	-45C (-49F)	390C (734F)	Negligible
E. Aviation Gasoline	715	-14.6C (-10F)	-46C (-49F)	1480C (2727F)	8-1 ts

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MICRO SWITCH Announces

Two New Enclosures for AN3234-1 Switches

These new small-size, lightweight, wall-sealed switches with rotary actuators are designed especially for the rapid and exacting requirements of aircraft use.

The rotary actuator arm is adjustable through 360°, with a range of travel up to 1/8th of a circle, with quick operation in either direction. Other features include protection from dust, dirt and moisture, snap-wire accessibility, quiet contact coupling AN3034; and many mounting. The switch units in these assemblies are MICRO.

Micro's single-pole, double-throw switches that conform to Aircraft Specification AN3234-1, drawing AN3234-1. Rating is 26.5 volts dc, 6 amperes at 50,000 feet, or 10 amperes at sea level. Mountings are rugged die-cast aluminum weatherized enclosures.

MICRO has a complete line of precision ship-aircraft switches which conform to Specifications MIL-S-6743 and MIL-S-6764 and many switches designed to conform to JAN-B-63. Call or write MICRO SWITCH, Pleasant, Illinois, or contact the branch office nearest you.

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Micro AN3234-1 precision switch with one AN3234-1 (Micro V3-1) switch enclosed. Single-pole, two pole three contact arrangement.



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Fuel Boil-Off Data			
FUEL	Initial Fuel Temp	Boiler Indirect Burner Output of 60,000 Btu/hr. in Proportion to 26.5 Volts dc	Pressure required to generate 1000 lb. RVP at 50,000 ft.
Type B— Kerosene	71°F (40°F) 77°F (30°F)	0 2.8	1.5 4.7
Type C— Methane Gas	116°F (40°F) 17°F (30°F)	0 0	0 0.2
Type E— Gasoline	158°F (40°F) 77°F (30°F)	0 4.5	1.1 3.5

"LOOK, SAM,
MEETING
TOUGH
TEST SPECS
IS NO
PROBLEM
NOW . . .
EVEN . . ."

No. 41065-B

(M. & A.R.S.)



The TennySphene Allis-Chalmers furnace has been built in two commercial sizes in steel-plate and composite, as shown in the drawing. Standard construction is 12 gauge steel. The drawing shows the 20 cu. ft. steel-plate model and the 40 cu. ft. steel-plate model. Specified range from -167°F to +205°F. Reference temperature 20% in 95%. Abilities are 10,000 Btu. Steel from 12 to 18 gauge thickness.

Temperature, heat and position, in the oven, can be controlled by using two heat controls by using heat ratio controls. Heat ratio controls are available in 1 to 2, 1 to 4, 1 to 8, 1 to 16, 1 to 32, and 1 to 64, and can be used at the expense of considerable weight and performance penalties.

► **Firing Fuel.** Propellant—Con-

cerning all these differences, Hart said that fuel filters are susceptible to blocking with ice crystals forming out of dissolved water, and also to blocking with solid hydrocarbons precipitated out of the freezing point of the fuel.

Study is underway, Hart said, to determine which propellant filters can be placed below their normal freezing points. Severity of filter blocking would seem to depend very much on temperature of the filter, flow rate through it, and rate of subcooling of the solid material. Considerable hydrostatic effects are anticipated, he said.

Hart referred to the vapor line return to these low-temperature fuel cooling would be if it could be done economically. He says it is impractical to cool adequately in flight without severe weight and drag penalties. And ground cooling is not feasible in a worldwide basis, although it does help efficiencies in the ground instead of adding them to the aircraft. Also, there are significant difficulties to be considered with the use of pressurized fuel, such as delved bilge.

► **Pneumatic Piping.** Fuel line with the same solidify materials can be sus-

cended directly to the aircraft, Hart said, to meet the toughest industrial and government specifications. Standard Tenny units measure normal resistance, withstand, explosion, proof, liquid immersion and other tests. Heater systems can be employed for complete protection. Two-stage pressure control assures absolute stability as changing temperatures and conditions, otherwise, continuous pressure legs provide腿 pressure regulation. For discussion and further information, write to Tenny Engineering, Inc., Dept. E, 26 Avenue B, Newark 2, New Jersey.

► **Tank Heating Out.** Hart said that tank heating is impractical except in a lot

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desert and involves a greater weight penalty than does tank pressurization, adding that it was not able to rely on reliability and on air factor loading of the tanks, which are a function of air craft speed.

He pointed out that nothing but experience with a wide range of aircraft operations will enable design for a reliable landing point. For years, aviation practice with a maximum freezing point of -60°C. (-76°F.) has been used successfully through the material, and there is little evidence that a lower figure than this need be called for in a turbine fan. He said that all types of operation should be satisfied with it, and that there is a strong possibility that partly cold requirements could be satisfied with a fuel of high freezing point of about -45°C. (-49°F.).

► **Frost Point.** De-icing the safety angle, he said, and that operators of commercial aircraft would provide the highest degree of safety. Also, that there is an inverse and considerable to the normal ratio of safety factor. He declared it is now generally accepted that the higher the frost point of the fuel, the less the risk of ignition in a hard landing accident. Also, the higher the frost point, the slower is the spread of fire.

Then he said, it is accepted in Great Britain that the development of the gas turbine for civil aviation must be into control with fuels of the kerosene type having frost points over 37.8°C. (100°F.). And, he pointed out, it is highly desirable that these fuels should be used in aircraft engines, particularly because heavy loadings of half-frozen aircraft are a frequent occurrence.

► **Frost Suppression.** Frost declined, as the basis of material in his paper, that an acceptable fuel must have these characteristics:

- High specific gravity (or volumetric efficiency ratio)
- Real vapor pressure of not more than 1.2 lb.
- Freezing point below -50°C. (-58°F.)
- Flash point of more than 37.8°C. (100°F.)

- Freezing point of below about 110°C. (230°F.) not from theoretical consideration but because there is no experience now with higher end point fuels.
- Maximum sulphur content at 0.2 percent, with the expectation that this may be increased to 0.5 percent.
- Maximum ammonia content of 20 percent with a probable increase, as a result of experience, to 25 percent.
- Some water on sulphur and ammonia balance.

- **Target Attainability.** He targets that it is the target, and follows with the query: Can it be reached?
- He concluded that aircraft must be capable of operation on tank fuels as

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MUSKEGON, MICHIGAN

are available in adequate quantities, but he says these must not be considered incompatible with immediate availability at the expense of losing sight of what is really required.

Cold requirements for gas turbine fuels can be met now, and in the foreseeable future with kerosene type. A fuel, particularly if it permissible to use, the freezing point at -45°C . (-59°F .), he says. He feels that there is as much reason to assume why the freezing point should not eventually be brought down to the present -60°C . (-76°F .).

Continence on KTP-Blow indicated that it is the rather high cost of fuel which is difficult to justify. The last war was fought with gasoline engines and the collapse of fuel quality, particularly knock rating, on the possible power output and economy was clear, he said.

Unfortunately there is no single feature of a gas turbine fuel that is as clearly defined in importance as knock rating of a piston engine fuel. But Hunt feels that the combined penalty of high vapor pressure and low specific gravity (lower, less voluminous) should result in the advantage of a 7 lb RVP fuel probably being used in gas turbines in certain areas in 57 octane fuel which is standard aviation in 1948.

The combined penalty may reduce the overall usage by as much as 25 percent.

This is much more than the usage savings following the improvement in specific fuel consumption made possible by an increase in compression ratio of a piston engine, spaced from 6.7 to 10.0 octane, and the greater takeoff power which enabled larger fuel loads to be carried.

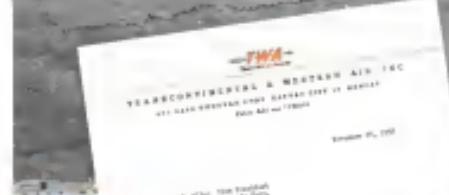
Gas turbine—For the immediate future, Hunt said that an amendment of the requirements previously discussed above, by deletion of the fuel point limit, provides the best compromise he sees available in service and availability, though special consideration may be needed for handling and in ground storage. Considerable time was expended some years ago about the risks of handling 1 to 24 lb RVP fuels, but Hunt pointed out that large quantities of kerosene at the vapor pressure were moved long distances during the last war without trouble.

Even if special precautions prove necessary, he said, some additional consideration on the ground as a small price to pay for the enormous performance in the air.

Ahead—For the longer term future he believes that the full significance of the characteristics previously discussed must be met. The problem, he said, is much easier than the one which the petroleum industry solved in 1940 in connection with the manufacture of 100/110 gasoline. And he said, the urgency is no great.

(Continued on page 57)

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Joy designs and builds each fan to the exact requirements for which it is intended. Each fan, therefore, is custom engineered for highest efficiency. For many purposes stock fans can be supplied from the excess or line already designed. Both single and two-stage fans are available. Our vast resources include single or three-bladed, hermetically sealed, continuous, radial, impeller, vaneaxial, and coated motor-driven impellers.

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Here are some of the many uses for Joy AXIVANE Aircraft Fans: Windshield de-frosting, windshield or wing de-icing, cabin heating, cabin ventilation, seat-back heating, ceiling radio and electronic equipment, ceiling voltage regulators, air bleeding, gear-box cooling, instrument cooling, air regeneration, and high-altitude pressurized housing.



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He feels that there is no doubt that a fuel wholly acceptable to the engine and aircraft designer can be made in adequate quantities if the effort is repeated. There is no room and no time, he feels, for the aircraft designer to do his own research and development all around and seriously interfere with aircraft research and our gas development program. Minimum aircraft performance must be maintained, he concluded.

Hugh Harvey (Shell Oil Co.) presented data on the desirable properties of jet fuels, listing them in this order:

- Low cost and availability;
- Combustion efficiency and stability;
- Safety;
- Clean burning;
- Stability;
- Good low temperature characteristics.

Harvey stated that he apparently had emphasized more in the U.S. than in Great Britain, and this has led to the formulation of a specification here for a wide range fuel with a high vapor pressure.

Research cannot be economically undertaken from other fractions of crude oil, and the supply is limited by what occurs naturally. The amount represents about 5 percent of the total crude production under present circumstances or a 1949 rate of about 12 million gallons per day. At least this figure could be raised to about 20 million gallons per day, just as 100 percent parity is not a small fraction of the amount world sulfur for all countries and yet research in this country has been years to come.

But the petroleum industry is faced with the problem of getting itself to meet world fuel requirements in the event of a third world war. And the magnitude of that problem is tremendous.

► War II, 1940-Present—During World War II the peak rate of world-wide jet fuel was around 20 million gallons per day, and the rate of crude oil production of the world at that time was 100 million barrels per day. This quantity was enough to power 37,500 propeller engines at 2000 hp. each for four hours each day at a fuel consumption of 4 lb. per hp-hr. (Total) daily bhp. 300 million.)

If all these engines were 5000 lb-thrust turbines instead, operating four hours per day at the same rate of about one lb. per hp-hr. of shaft, the daily fuel requirement would be 91 mil. bhp. hours. This figure is only half the present crude production rate in the U.S.

The specific potential consumption led to formulation of aviation fuel specification MIL-F-824 formerly known as AN-F-68 and more recently known as JP-4, a moderate petroleum fraction which boils between 150 and 460°F. and can afford 50 percent of a barrel of crude oil as jet fuel.

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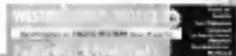
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Piedmont C-129

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F-30



Convair
XPBTF-2

filter clogging is a very real problem.

Studies made by the industry indicate that filter clogging is only present with certain aromatic type fuels. (Heavier fuels tend to freeze out in the form of waxes and clog the filter elements, the flow required for the clog being varying between fuels.)

For this reason—consideration of heavier type fuels—does bring up the problem of selecting the proper. The industry has made a great deal on the characteristics of the various aircraft powerplants since it is a function of velocity and pressure at the burner.

Then, some engines can be started better by slowing than speed and allowing the burner velocity to decrease thereby, and other engines can be started best by speeding up to increase the pressure at the burner by this. Stoichiometric influence on starting may be a factor in this, as well as the burner design off course fuel and nozzle location with respect to plug.

General conclusion is that the burner fuel must be started (shown flame test) but that by good engine design they can be started under all required conditions.

Rapid combustion of fuel requires perfect mixture of fuel and air in proper proportion. This necessitates the best possible atomization of the fuel, but this cannot be obtained with fuel imbalance and gas exhaust.

A low fueling rate and high air temperature are the requirements, and as they have to be derived because of the low fuel economy of the jet.

Desirability of low atomization is shown because the rate of heat absorption of the fuel droplets is proportional to their surface area, and the rate of temperature rise is inversely proportional to the volume of the droplets.

In order to provide good combustion over wide limits of fuel-air ratios, it is necessary to have fuel droplets very fine, with a fuel-air concentration gradient at the burner.

► **Nease Developments**—Dengenauer has stated that FAW was trying to develop fuel nozzles that could exert a 10:1 range of flow with a maximum permissible pressure drop of 100 psi. Fuel pump pressure provides a definite limit to this accomplishment in that way. Maximum compression discharge pressure in a medium or high pressure nozzle is about between 100 and 200 psi. Fuel entering is assumed to attain another 100 psi pressure drop. It is also assumed that 100 psi fuel pressure is available, that leaves only 200 to 300 psi fuel pressure drop for atomization.

If the nozzle could operate at higher pressure, these better atomization would result. But higher pressure operation is a matter of manufacture and fabrication, so far, until you are not

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available that still operates at high pressure without adequate lubrication.

Because type fuel, Diesogenerator stated, would partly aid the problem of coordinating the pump, motor and burner.

►Disadvantages. Two—Although the lower fuels are cheaper and more readily available, there are limits to the advantages to be gained. For example, transmission sample pressure is increased by heavy loads in the case of most oil. The figure is 16 times that required for the same flow rate of aviation gasoline.

AF Specifies Policy For Cadmium Parts

The Air Materiel Command's supply division has issued detailed new procedures and practices for the use of cadmium plating on parts to protect them in storage or in locations covering the world range of climatic conditions—arctic, desert, ocean, heated or moderate.

Manufacturers are required to treat with approved corrosion preventive compounds specified areas, such as aircraft hardware and ground test bonding

Commercial Jet Fuel Properties

(Prepared by R. A. Diesogenerator,
F. A. W.A.)

Specific gravity at 60°F	0.830 max
Distillation temperature, °F	500 max
10 percent evaporation	100 max
20 percent evaporation	105 max
End point	573 max
Low pressure	125 max
High pressure	135 max
Viscosity, centistokes	
at -60°F	10.0 max
at +50°F	0.80 max
Stability	0.00 max
Gross heat of combustion, Btu per lb	13.8 max
Boiling point, °F	1000 (at 20 mm Hg)
Flash point, °F	100 max
Net heat of combustion	10.00 max
BTU per lb	100 max
Freezing point, °F	-20 max
Autoignition temperature, °F	420 max
End point, °F	120 max
Copper tube corrosion	0.00 max
Water solubility	2.0 max
Cloud point, °F	-90 max
Cloudy point, °F	-100 max
Viscosity, °F	+12 (at 50°F)
Density	5.870 max

One nozzle will not give optimum performance for different fuels. Change spray angle and drop size, or, conversely, the change from aviation gasoline to JP-1 in a given nozzle configuration has resulted in a 40 percent increase in minimum flow. (Minimum flow is based on the lowest flow at a given pressure for an acceptable nozzle spray, and spray has a direct bearing on the altitude at which ground contamination can be minimized.)

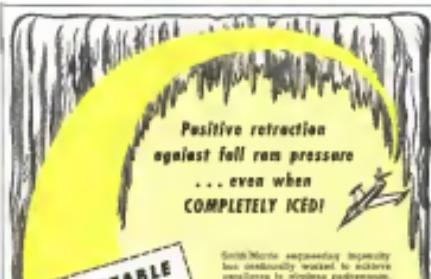
So, it becomes obvious, he said, that maintaining good combustion depends on thumbanking on a single fuel.

He then presented the characteristics of a commercial aircraft turbine fuel which will be the best balance that could be obtained for turbine-powered aircraft in their present form. Basically, the fuel is a good grade of number one straw oil or kerosene, and in the type of fuel, he said, that would be most satisfactory in P&W's T-36 engine in commercial operation.

equipment, having less than .0005 in. of cadmium plating.

Parts having precision surfaces and close tolerances are exempted. And for those where the protective would be detrimental, such as aircraft interiors, insulation and support panel fasteners, in which the cadmium is dehydrated, must be used.

Items to be included in the category are electronic equipment, instruments and composite structures. Specifically, this includes all sub-assemblies and assemblies containing cadmium plated parts in combination with organic materials.



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Systems Engineering Guided missiles experience ads Martin in implementing this airplane design concept

Guided missiles were the first aircraft to attain supersonic speeds, the first to accomplish sustained flight at supersonic speeds, and will be the first design integration of components which The Lewis-Lewis Martin Company calls "Systems Engineering." The Lewis-Lewis Martin Company has designed Engineers to work with the aircraft designer, providing the most feasible and being assigned increasingly difficult missions. It is essential that there be no limit to the imagination of the aircraft designer in flying vehicles whose sole goal is speed.

With a background of demonstrated accomplishments on ten-level, missile programs and continuous growth in the field of aircraft design, The Lewis-Lewis Martin Company has carried over Systems Engineering from its missile experience to its airplane design. The Martin engineers have ten basic aircraft and missile programs assigned to all three of the areas of functional elements involved in the process of a aircraft design: aerodynamics and performance; aircraft systems; and military armament or passenger load.

Martin Systems Engineering recognizes that the immediate problem of aircraft design is to get the aircraft into the air as quickly as possible. The aircraft must be designed to achieve performance, but to integrate the necessary electronic and mechanical systems into the aircraft design, the aircraft must be designed to carry military weight. And whether the weight is in a mounted engine or a guided missile, it is important that the aircraft designer be able to determine that the aircraft design represents a completely coordinated system. There is no situation in having to decide the weight of the aircraft when the passengers weight, which may necessitate altitude changes, is still a plus in the designer's eye.

That is Martin Systems Engineering. The Lewis-Lewis Martin Company's aerospace, electronic, control, aircraft, aerospace and missile experts—well as aerodynamics engineers and metallurgists—have the experience and specialized instrumentation specialists—all part of the well-integrated engineering team. The Lewis-Lewis Martin Company offers all customers today:

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A-37A aircraft
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Boeing and Martin are
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responsible for the
manufacture of aircraft
and aircraft components.

Hydroflaps allow advanced base flights
from restricted fields of water—permits
safe operation from seaplane tenders—
improve survivability in air-sea rescue

A pair of hydroflaps under the wings on the new Martin A-37A (A-37) Martin, shown here, are designed for fast takeoff and to serve as stabilizers for increased rates of stability—share distributed roll problems common to all seaplanes. They prevent rollouts from water and restricted fields. Give added safety when landing into a seaplane tender or when operating from a small boat. Hydroflaps also reduce roll and increase survivability in air-sea rescue work.

Hydroflaps are just one of the advanced designs of this modern, self-launching seaplane, the Boeing-Martin PBM-1 Martin seaplane. The Martin is the first aircraft with hydroflaps, aeronautic devices for detecting rollovers, as well as sensors for detecting them. Its sleek, streamlined profile gives it more speed than all other fighters. Its long, extended tail dissipates the conventional "Mig" gives it much greater stability. The A-37 is the first aircraft to be designed to meet the needs of the new, advanced aircraft requirements of the U.S. Air Force. Shaded numbers in the drawing indicate the locations of hydroflaps. (Boeing-Martin is a division of The Boeing Company, a division of The Boeing Company.)

3



JET-FLIGHT CONDITIONS TO ORDER

This altitude chamber is one of a pair of units used for simulation in the new, \$150,000 jet-propulsion research laboratory at NASA's Lewis facility at Cleveland. Designed to accommodate powerful jet engines, altitudes, chamber has capacity of 350,000 cu. ft. of high pressure air at altitude and exhaust exit will handle 1,000,000 cu. ft.

New Fire Aids Developed by CAA

Two new aircraft fire safety aids have been brought out at the Civil Aviation Administration's Technical Development and Evaluation Center at Indianapolis.

One of the developments, a flame extinguisher reference scale, will help in bringing out low flammable hydraulic fluids and fuel oils. Function of the scale is to set up yardstick ratings for flame extinguishers. The scale (ASA-1000) consists of the ASA-1000 (Hydrofluorocarbons) consistent with the test added safety to the latter's flame characteristics when the content is diluted through an oxyacetylene flame at 1000° F.

Flammability Ratings.—Thus, a fluid which requires no hydrofluorocarbons to be considered non-flammable and in

given a new rating. Increased ratings would indicate increasing flammability. According to the scale, gasoline would have a rating of 50, some hydraulic fluids, 72, kerosene and 60, while some of the newly developed hydrofluorocarbons may ratings from 40 down to zero.

New Coupling.—Design requirements for an automatic fire-extinguishing coupling for fuel lines were formulated by the CAA and are now being developed. Data from the CAA tests already have been made available to those coupling manufacturers who will use the information to conduct required experimental work for further testing at CAA's evaluation center.

At present designed, the coupling is designed to discharge automatically with a 75° fall at an angle up to 35° dig, sealing off the ends to restrain the fluid. Removal is accomplished simply by pushing the ends together.



DAMPENS BOOM OF 94

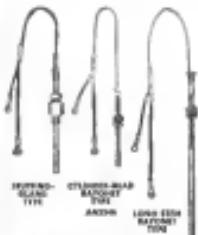
Great Martin aircrafteller rate of 94°/sec. in plane's engine can at full throttle, with aluminum as a primary at Lockheed Aircraft Corp.'s Van Nuys plant. Unit a steel cylinder, 25 ft. long, 7 ft. in diameter. External and has ability to accommodate plane's engine, and is fitted with nozzle

ing mounted to water line. Spray nozzle at plane's engine can at full throttle, with aluminum as a primary at Lockheed Aircraft Corp.'s Van Nuys plant. Unit a steel cylinder, 25 ft. long, 7 ft. in diameter. External and has ability to accommodate plane's engine, and is fitted with nozzle



for Aircraft

FOR BEST RESULTS USE THESE ACCURATE, RESPONSIVE, STURDY TEMPERATURE-SENSING ELEMENTS WITH LEWIS RESISTANCE-TYPE THERMOMETERS.



Private label is designed for each mounting for the wiring method.

AMBER-1 and AMBER-2 standard type. Thermistor is a standard type with a standard lead. Thermistors exceed the response and reliability requirements of the Department of Defense MIL-STD-883C.

STAINLESS-STEEL THERMISTOR is a standard type for mounting liquid measurement.

STAINLESS-STEEL BARE has a probe which is a standard type with a standard lead and is used with solid-state strain gauges. The probe is a standard strain gauge probe. The probe is a standard strain gauge probe. The probe is a standard strain gauge probe.

In addition to these classified, we manufacture standard resistance thermometers for industrial applications.

**THE LEWIS
ENGINEERING CO.**
Manufacturers of Complete Temperature
Measuring Systems for Aircraft
NAUGATUCK, CONNECTICUT

Sperry engine engineers are a cash to work on, but the A-100 indicates great power and heavy loadings. ■ Engine Step-Mile Test: In the R-4360 engine, Overhaul time has been boosted to 300 hr.

Big improvement is expected when these modifications are completed.

- Installation of new, manufactured exhaust valves. Accompanying longer valve guides will help heat transfer from valve to cylinder, thus reducing valve temperature and failure rate.
- Use of longer connecting rod. Pistons are now machined on new surfaces, reducing stresses on piston pins. The modifications are in progress; no dates have been completed.

Another problem is exhaust stack failure. No immediate solution is up to present, according to Sperry.

Chapman R-1781 spark plugs are used exclusively and PAA expected satisfaction with their performance.

All of Sperry's 30 engines are being converted to accommodate the Sperry exhaust system. The company also has obtained excellent results with the supercharger installed in its fleet of Model 749 Constellations, which were sold to Air Charter some time ago.

Leakproof Valves

A guaranteed leakproof line of check valves for hydraulics and pneumatic applications has just been put on the market by Jean-Paul-Clerc, aeronautical engineer of Poitiers, France. Features of the valves, according to the manufacturer, are: ability to reduce maximum flow resistance, and leakproof dependency plus quick opening and closing close to 45° position.

The company says it has spent five years developing and refining the design called "Circle Seal." Reliability of the unit was produced only in a custom basis.

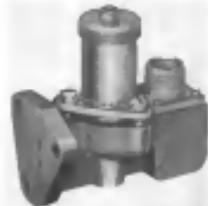
Operating pressure for standard types is 300 psi. Standard, for low pressure valves, is 100 psi of water. Poppet close at zero flow before return flow starts, the company says.

Task of sealing the valve leakage of a one piece synthetic rubber "O" ring between the metal surfaces on the poppet and the valve housing. As bias pressure increases, sealing action becomes more positive. The seal seats while pressure loads on the poppet are carried by a metal shoulder in the valve housing (no drawing).

It is claimed that these low resistance features for the valve between the seat and rubber "O" ring, reduces noise and cut-down shock, reducing wear and seat fatigue of the poppet and body.

Aberrant particles entering between poppet and seat are wiped away by the "O" ring. If damaged, the seal may be replaced easily without special tools.

NEW AVIATION PRODUCTS



Valve Saves Fuel

A spark advance control valve, designed to increase flying range by cutting fuel consumption up to 10 percent, is being marketed by Aetos division of General Metal Corp.

As a bonus, the valve also increases life of sparkplugs and exhaust collector cans by reducing supercharger temperatures, the maker claims.

Designed for mounting on the aneroid, it has a pressure cap, which, when electrically energized by remote control, the rate decreases flow of engine oil under pressure to an actuating cylinder. The cylinder is then, whenever engine is running, spark, which is automatically retarded when the control valve is energized.

The device, No. 21951, is described by its maker as being simple, compact—only three series need be replaced for all aircraft engines.

It's completely sealed and designed to withstand extreme vibration. Rated operating pressure is 100 psi, while operating pressure range is 0 to 200 psi. The solenoid is a 12-Vdc continuous duty type. Valve measures 3 1/2 x 2 1/2 in. Weight 107.77 lbs. Owen St., Bedford, Va.



Lightweight Motor

A reversible, miniature induction motor, rated at 1/16 hp and weighing

only 10 oz., has been developed by Eastern Air Devices, Inc.

According to the maker, the unit, designated JWD-16, meets all present JAN-46 specifications and can have the fan motor be turned to meet Air Force Handbook Specification 4185G Method 13. The motor originally was designed for continuous duty driving of a 3-in. diameter Tarnington fan blade, Model B-127-4-B. It operates on 208V, 3 phase, 460c current, is rated at 1/16 hp, 0.25 amp, 16,000 rpm, and measures 11 in. in diameter and is 11 in. long. Address 585 Dean St., Brooklyn 17, N.Y.

ALSO ON THE MARKET

Mobile hot-cell test stand will produce temperatures from -75 to 250 F. for testing aircraft components measuring up to 6 x 6 x 8 in. Compact machine uses methyl ethyl chloride refrigerant and has flexible conductors for power and water supply. Made by Electro Mechanical Division of George L. Narkus Co., 19125 W. Division St., Detroit 23, Mich.

Dynamometer measures torque developed by power sources rated from 1 to 10 hp. Drive dissipates 4 hp continuously at 1600 rpm, may be set at any speed from 0 to 8000 rpm. It weighs 170 lb., has handles for carrying by two persons. Made by Avion Testress Corp., 121 E. 28 St., New York 10, N.Y.

Plague-type toggle clamp positions and holds bushings in place at pressures up to 400 lb. in 1 hr. in a range of high, intermediate and low ranges, measures 3 x 4 x 1 1/4 in., weighs 5 lb. 19 in. long. Made by Detroit Stamping Co., 182 Midland Ave., Detroit 1, Mich.

Direct-reading pressure gauge gives response of less than 1 second, is capable of measuring absolute pressures from 0 to 1000 inches of mercury. Said by maker to be particularly suited for low elevation work in pressure operated control systems. Made by Hastings Instrument Co., Inc., Hastings, Va.

Micrometers can be used for all measurement from 5 to 12 in. by means of a telescope eyepiece. Each of the verniers is marked in scale capacity, is fitted with an adjusting collar to compensate for wear. Dual scales with metric, inch, standard and vernier. Made by L. S. Starrett Co., Athol, Mass.

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7,200 lb. thrust



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Swedlow PLASTICS COMPANY announces

additional facilities in
YOUNGSTOWN, OHIO

TO SERVE with more speed and efficiency its current customers and the continually expanding needs of Eastern and Middle Western industries, SWEDLOW PLASTICS CO. has now added a mid-western plant, as complete and modern in equipment and facilities as its West Coast plants.

Swedlow Plastics Co. facilities are devoted exclusively to manufacturing continuous low-pressure laminates and fuel cell bonding, in accordance with applicable Air Force, Navy and custom specifications, and custom fabrication of sheet plastics, specializing in aircraft applications and a wide variety of other industrial needs.

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AIR TRANSPORT

Cargo Run Slated for Jet Bomber

Prototype Advisory Committee tentatively agrees to test B-45 first, B-47 next, then a turboprop.

Testing of the North American B-45 four-jet light bomber by an aircrew on a standardized cargo transport route is expected to be the first flight test program under the new transport prototype program authorized by Congress.

At its first meeting last week, the U. S. Prototype Advisory Committee, meeting in Washington, set up a program for testing and specification writing which tentatively led off with trials of the B-45, followed by a plan to make similar trials with the faster turboprop Boeing B-47 jet bomber.

Next in line will be tests of cargo and mail turboprop planes. The Douglas C-133A, possibly the first in this class, is in a conversion. Cost was later 244, powered with Allison T-56 turboprops, the only cargo turboprop type which has jet power in the country. It will likely be followed by the new turboprop version of the Douglas four-engine Globemaster II (C-124B) when it becomes available, next year.

Date of the beginning of flight test programs depends on Congress which has yet to make available the \$12.5 million appropriation for the testing program, authorized in the last session. It is expected that the appropriations can be completed in time to get started in March.

In the long-range transport prototype testing program, turboprop air freighters and C-133A will be the first to have top priority. But since not a single turboprop transport is available for testing this spring, the test of a jet bomber on simulated airline operations will be first.

► **Prototype Program.**—The committee at its first meeting adopted this program of prototype testing and a test panel. Set up a technical subcommittee to do this. Specialists will be invited by the technical subcommittee to advise on individual programs. There can be a separate technical group operating with the subcommittee.

► **Obtain a pure-jet bomber** from the Air Force to test on simulated airline operations.

► **Establish** a cargo transport installation at Memphis at the earliest date by move between the military and the industry.

► **Ask** the military to make turboprop-powered versions of the transports available for testing under the committee's direction.

speeds of 50,000 lb. as much. And **Swedlow** & Weyman President Ross A. Norkus told the committee, of which he is a member, that 100,000 lb. payload should be developed. Some 200,000 ton-miles are agreed with him.

Representing the domestic manufacturers, Army Aircraft Board told the committee the Cessna 123 assault transport with turboprops looked like the most economical medium range plane in sight.

Besides the Allison and the Douglas turboprops, there is a possibility that Boeing could build a turboprop version of the C-133A, the Lockheed C-97, or the Douglas C-124, which would also fit into the testing programs, although Boeing's main emphasis, thus far, has been on pure jet transport designs.

The prototype committee wants to get into a transport program for the Globemaster so soon as Allison has completed its first intensive study of power plant, propeller, operating characteristics of the plane. It is planned that all the testing programs will involve testing arrangements with the owners of the aircraft.

Reported problems for the committee is the availability of the military aircraft. Maj. Gen. M. B. Nelson, USAF, representative on the committee, did not contact the services on this point. Obviously availability of the jets and turboprops a year from now is subject to some possible military action.

► **Freighter**—Based operating in quantities of the freight version have already been drawn up by Air Transport Area and the Federal Aviation Authority. (AVIATION WEEK, Nov. 20). No price



NEW STRETCHER LIFT

New electronically operated aircraft stretcher lift developed by Douglas for the C-141 tactical cargo plane or cargo AVIATION WEEK Jan. 21. Patients or cargo are moved in less than one minute. The capacity is two patients or 500 lb. of cargo. Lift is a counterweight from the ceiling, from the ground. Power is supplied by an auxiliary motor or directly from the plane's power system.

merging from specifications 6 or perhaps near the development stage in yet, although some are on the boards.

The letter group working with the committee will refine the operating requirements of the feeder so that a potential manufacturer will have a good idea what to build. Part of the STLS-3 action item prompted the committee for spec writing and testing with help from potential manufacturers with test development units.

British fighter planes like the de Havilland Dove and Heron, Miles Mothia, and Puma and Folland were passed over completely by the committee because of the complexity of U.S. policies and "special interests" involved (AVIATION Week Oct. 30).

►**Prop-Jet Transport.** The committee approved unanimously the plan to place jet bombers in simulated transport operation. This way they plan to find out what they need to know about U.S. jet transport, engine design, maintenance, pilot recognition, fueling, maintenance and support.

The plan was originally to be funded by the Air Force by "bulletin cost" (assignment) as base funds to CAA. CAA in turn would contract with an agency to operate the planes in the test operation. Although the de Havilland Comet and the Avro Jetliner would probably be more suitable for testing in U.S. simulated transport operation, it is claimed the jet-propeller committee will go for it as possibly first with American planes.

Between now and May, the committee will be documenting on sheeted up detailed plans on aircraft availability for test, test planes to test, and how to put them.

►**Prototype Air.** The Prototype Aircraft (Testing) Act, Public Law No. 93-367, declares it to be the policy of Congress to promote "the development of improved transport aircraft, particularly jet-engine-powered aircraft, aircraft especially adapted to the economic transportation of cargo, and aircraft suitable for feasibility operations."

Committee Secretary Charles Sawyer delegated the authority of administering the act to Civil Aeronautics Administration Board. Nyrop, Nyrop is chair man of the Prototype Advances Committee, with Deputy CAA Administrator Fred Lee as alternate chairman. CAA Chief Engineer Harold D. Hartman is a executive member of the committee.

Other members of the committee at the last meeting were: Dolores Rovello, CAB Maj Gen M. R. Nichols, USMC; Director of Requirements, Office of Chief of Research and Development, Army Materiel Command; David Schubert, Air Line Pilot Assoc.; Admiral D. C. Kamm, Admiral Transportation Area; Admiral Fra-

ry S. Land, AIA; Anne Hancock, Air Coast Transport Area; Robert Pecoret, Flying Tiger; Raymond Niederauer, Sealab and Wetman; J. W. Casper, NASA.

Under the act, the group would:

- See what kinds of transports would be needed. This meant preparing operating and general utility characteristics and specifications for advanced design prototype aircraft.

How to Fit Nonskeds in the Picture

Large irregulars offer plan for renting their fleets on military contract basis during mobilization.

First industry proposal by the large irregular carriers for striking their fleet as a military contract basis was signed up for study by Civil Aeronautics Board Chairman Dolores Rovello last week. The U.S. domestic nonskeds association, which has organized a nonskeds fleet expansion from 1960 to 1965, yet to be put into place yet at an airlines mobilization plan.

The new plan was submitted by Air Coach Transport Area President Anna Elsasser, to Rovello for consideration by the National Security Resources Board Civil Air Mobilization Task Group of which Rovello is the chairman.

Three large irregular carriers are already operating 22 DC-4s on the Pacific with, partly with planes they chartered from domestic nonskeds. If more DC-4s are needed, probably of the same size, leasing from the nonskeds fleet would go to the study through the normal operation of supply and demand.

The obvious carriers would charter these DC-4s by offering the service a better rate for the planes than the domestic nonskeds can offer with them.

This leaves the 67 C-46s and 38 C-47DC-3s still operating around the U.S. on a cash-on-delivery basis, mostly on air coach and special charter. ►**The Nonskeds Problem.**—The problem is how to fit the planes and crews of these planes into indifference. About 70 nonskeds companies two about two thousand each, fit the category.

Utilization of these planes in the civil economy is very low, by statute as well as by the nature of their business as "large irregular carriers."

These nonskeds who are acting high civil utilization are generally operating their authority under their CAB exemption, and probably will shortly lose their right to operate at all if their exemption comes up for renewal by CAB. This is because the exemption of a large irregular carrier depends upon its operating "regular and inconspicuous" flights between major cities.

- Test turboprops and turboprop planes under scheduled or transport conditions, to insure this will be mandatory in developing advanced prototype planes.
- Test planes developed from original specifications called for by the committee.
- Provide for older equipment configurations of aircraft as selected by the testing program.

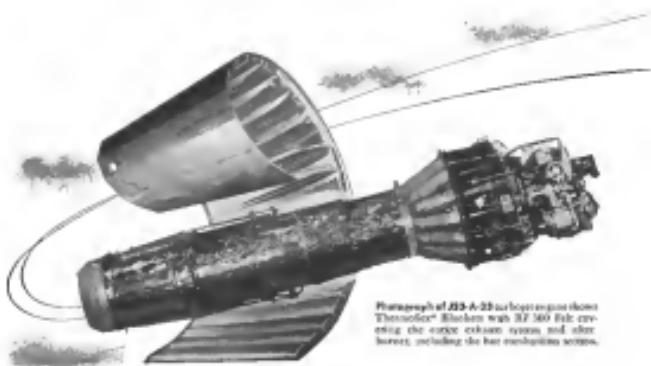
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Photograph of B-53 in flight again shows Thermoflex® Blanket with RF-360 Felt insulating the engine exhaust system and after burner, including the hot combustion section.

New type J-M **THERMOFLEX** **BLANKET** insulates world's first production jet with afterburner

SHEILDING the entire afterburner and exhaust assembly on the Air Force's new B-53 turbo jet engine for the Lockheed F-94 All Weather Fighter required an insulation that could withstand not only terrific temperatures, but high frequency vibration as well.

To meet these specifications, Johns-Manville has developed the Thermoflex RF-360 Felt—a homogeneous refractory fiber that provides exceptional thermal efficiency, greater flexibility and a 35% saving in weight over previous insulation blanket fibers.

Air Materiel Command has just now this new felt has excellent stability in 3000°F. Its insulating efficiency is such that a 1/2" thick blanket produces a 1500° temperature drop between the hot fire and the cold side of the screen when the hot fire is in the range of 1900-2000°F. And it is effectively dangerous high-frequency vibration.

Thermoflex Blankets are fabricated with the RF-360 Felt sealed between sheets of carbonaceous fibrous or vitrified coal, coke-fibers and glass or spot-welded as required. They are custom-made for insulating engine powerplant assemblies such as aviation gas turbines and exhaust systems and in avionics, pressure and fireproof heating systems, fluid storage tanks, air conditioning systems, thermal deicing ducts, etc. Special performed shapes are also available to fit intricate surfaces involved in many aircraft and powerplant applications.

For full story on Thermoflex Blanket and RF-360 Felt, write for Brochure AV-1A, Address Johns-Manville, Box 296, New York 16, N. Y.

**PRODUCTS for the
AVIATION INDUSTRY**



Johns-Manville

AA, TWA Luring New Travel Market

Two major domestic airlines have been at work to tap a new air travel market—the millions of U.S. corporation employees by presenting incentive schemes, featuring package vacation trips by railcar to points for increasing production, upping sales, or during short-term or annual goals.

Continued from Page 10 of this magazine, American Airlines with a plan called Millions for Holidays and Trans World Airlines with its AA's Travel Awards Program.

Both AA's and TWA's schemes are basically similar, vary in details. Both are designed to induce corporation employees with the idea of picking up points that become negotiable for trips to the respective airlines—no money paid out. TWA's program starts Sept. 1, AA's the October metropolitan point that can be used for travel to cities, airports, lodges and the like. For instance, AA's plan is a five-day visit to Mexico, complete with transportation, hotel accommodations and team round-trip airfares collecting 387 points.

Three separate angles are involved in handling Millions-for-Holidays. AA which will sell the plan to corporations and furnish the air transportation, Gulf Spars Corp., St. Louis, Mo., which created it and will furnish the promotion materials necessary to keep the campaign going, and American Airlines which will take care of necessary ground transportation involved in the plan.

The TWA Travel Awards program originated within the airline about three years ago but has only recently been refined and put into action. TWA will handle the main burden of the control, selling the idea, furnishing air transportation, providing promotional items and will arrange with local travel agencies to take care of ground transportation and accommodations.

► The Millions-for-Holidays U.S. corporation program is \$15 million in incentive plan for last year, both companies are optimistic about the possibilities of their plan. And with production efficiency becoming a major factor in today's strapped defense programs, they see an eager market.

The writers behind the plan is easily found in the new competitive forces that have been apparent in the domestic market. Since American pulled out of the passenger business with the aid of American Overseas in Pan American, it has been able to expand its focus on building up domestic business. Domestic passenger airlines can't afford to let the trend continue—definitely—but the smaller carrier by

TWA with its own incentive program, ► Space Available—Neither airline yet are sufficiently being able to supply such for the passengers despite any possible increase in traffic because of the defense program.

No Decision Yet on Cross-Country Route

The four-man Civil Aeronautics Board is still working over the Southern Service to the West, now attending to Chairman David Rostel.

Eastern Air Lines is the leading one contender for a Milwaukee to Coast Route, followed by CAB Board member and East Coast Airlines Airlines. Airlines is fighting Eastern's application, claiming the use of American-Delta's route is enough, "a through travel on their route," at that.

Report recently that the Board would decide against the application of Eastern and then for a through route to competitor, presumably based on Rostel's statement of policy and action. In this statement, Rostel mentioned that the Board's policy was to reduce airline competition, aiming to keep fares off the market. The proposed Eastern transcontinental route would be competitive presently with American and Delta.



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This compact, light Cowling Latch makes a think insertion in all times and is extremely simple to operate. They are being given a heating and cooling test right now.

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► SIMMONDS INDUSTRIES INC., 333 Market Street, Philadelphia, Pa. 19106, needs to hire a sales force of about 100 persons to handle all of about 7,000 accounts on domestic and 3,000 foreign accounts.

Although designed for engine cowling, this unique device is finding practical application on cargo doors, aircraft hatches, aircraft fairings, aircraft wings, propeller fairings and other places where high strength is required.

Our engineering and development division is ready to copy your specific locking mechanism and shape this product to your standards as special requirements. We'd be glad to send complete details and specifications.

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Montreal, Canada

EDITORIAL

He cautions that with the industry at its present size "we lose perspective that we can regain only by halting a moment in our breathless race truthfully to appraise our deficiencies and then see where the future is likely to lead us."

The speaker's comments deserve wider circulation than they have been given.

Landing Speeds—Higher landing speeds, Mr. Loening believes, are an easy fix to improve the airplane. "As a result, we have added the notion, balance, both cost and robbery, with the impractical and unsafe expense burdens of huge airports, with constantly present hazard on landing, increasing burdens on studies of traffic and discouraging locations on wide personal use of aircraft."

First Generation—In that first early generation that I witnessed, how very slow and stupid we were in following name quickly and eagerly to take up the tailplane type, the simpler and easier monoplane, all-metal construction, amphibious, wheel landing, variable pitch propeller, wing landing flap, closed cockpit. All these features were being presented for years and yet few were interested.²

Today's Generations—In the second generation, 1956-1959, this pioneer engineer and manufacturer sits at his work not being really blind and stubborn "in not vigorously taking up my design development (even with Bellini and Korda to pull on), in pushing the helicopter and its 'unconventional' series, not only for war but for civil, had to overcome, in realizing the new aircraft in design, in the original approach when disengaged from the first series of the helicopter type, as providing great load alleviations both for the safety of the aircraft's load, maneuver, traction and the

comfort of the sick passenger; in various devices, including induced air flow, to slow the fastest plane down for landing; in providing very ample crash-protected areas for passengers; and how slow we have been to realize that its courageous airline makes the airplane something but a good neighbor."

The 1970 Plan—in research, Mr. Loening says we have done well, but more accomplishments and goals

—Robert H. Wood

are hidden by military security. However, he expects the 1970 surplus to look like this:

It will cause 1300-1700 mph, be extremely maneuverable, land almost vertically, be built largely of titanium, have an auxiliary engine for taxiing and have its controls effected by an flow (rather than flap), due to the slow speed requirement, have a landing gear suitable for either hard, water or snow, have variable sweepback, incorporate gall altitude structure and set springs to take the heavy air bumps at high speeds, have instruments for the pilot, many more automatic operations, and above all it will be inexpensive.

New Ideas.—To accomplish these results, however, and others such as eliminating weather as a hindrance, we must give obtain encouragement to the young engineer with new ideas and recognize that old ideas and superstitions as present also in aviation, and are a greater drag than in other fields, because air progress moves so fast.

"We must also prevent competition, particularly in rewards, otherwise talent will wither under the too authoritative eye of the commanding officer. And above all, we must not draft promising technicians and take them away from that essential life stream of technical production to be killed in a front-line because technical production is to sustain them half-killed."

Other Progress—Airbus will carry "enormous" traffic in 1970. Extension of aircraft range steady "if for transoceanic anything we have every demand of, particularly when we presently enter the atomic-energy-engine era, which will succeed the jet engine era." Safety is improving.

Cost—What seems not to improve, Mr. Lanning adds, is the constantly increasing expense involved in developing assault and their components, and in using them. But "higher expense is not a deterrent if higher enough value is obtained, a given at the same time."

Honest Thinking—So, says Mr. Loesing, let's return to the straight thinking of the Wright Brothers, "to the realization that honest thinking is always the winner in a contest with progress. Then, only, will we solve our present difficulties."

Good advice for the smart operators in our industry;
oldsters too.



The Bridge That Flew To Korea...*Overnight!*

All bridges across the Han River had been destroyed by retreating North Korean Government forces, holding up the United Nations advance. We needed to bridge the Han in a hurry.

Back in Japan, U. N. troops prepared a 230-ton, 609-foot passenger bridge-in-section—up fit into the U.S.A.F. C-130. Prior to arrival, plans to plant this fine

the bridge to Korea overnight.

Here again, Fairchild C-119's displayed unique versatility—under rigid military conditions. Built compact, rough and rugged "Flying Boxcar" are airlifting everything for the Army, Air Force and Marine Corps—personnel, tanks, ammunition, hospital equipment—even BRIDGES! It is the backbone of the air lift in Korea today.



The logo for Fairchild Aircraft Division. It features a stylized 'F' composed of a series of horizontal bars of decreasing length from left to right. To the left of the 'F' is a small graphic of a propeller. To the right of the 'F' is the text 'FAIRCHILD' in a bold, sans-serif font. Below 'FAIRCHILD' is the word 'Aircraft Division' in a smaller, italicized, sans-serif font.

Flight testing an idea



Complete electrical systems for any given aircraft can be simulated on this network analyzer.



Radial-type engines help this test stand duplicate aircraft power systems for testing purposes.

Even ideas are flight tested at General Electric. Both before and after an aircraft electrical system is built, G-E's aviation divisions check it out under actual operating conditions to save you expensive "de-bugging."

Your power distribution system, for example, is first "flown" on the analyzer. Electrical circuits for your plane are cranked into the board and the idea is worked over until the analyzer OKs it.

A model then gets a long rugged workout in the Aircraft Systems Test Lab to iron out final kinks. When design is "right," production begins. Finally, individual component parts are tested before installation in your aircraft.

Project engineers are chosen for experience as well as scientific "know-how." Pilots, navigators, flight engineers, military and transport, are represented. George Phillips, for instance, shown "flying" a distribution network, is an ex-Air Force maintenance officer.

This combination of theoretical analysis and practical testing by men who know aviation problems means trustworthy electrical systems without extensive "de-bugging" after installation.

For aircraft electrical equipment that will give you long trouble-free service, call your General Electric aviation specialist or write Apparatus Dept., General Electric Company, Schenectady, N. Y.



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